

# 1969

**OPERATING  
SUMMARY**

**BERTIE**  
**water**  
**treatment**  
**plant**

TD  
367  
.A56  
B47  
1969  
MOE

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RESOURCES COMMISSION

LABORATORY & RESEARCH DIVISION  
MINISTRY OF THE ENVIRONMENT

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

**TD**  
**367**  
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**B47**  
**1969**

Bertie : water treatment plant.  
81613



*Water management in Ontario*

Ontario  
Water Resources  
Commission

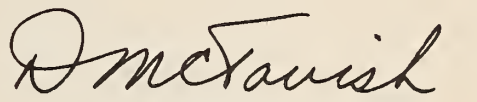
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Toronto 195  
Ontario

The operating efficiency and financial status of the water treatment facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

  
D.S. Caverly,  
General Manager.

  
D.A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.



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**BERTIE**  
**water treatment plant**

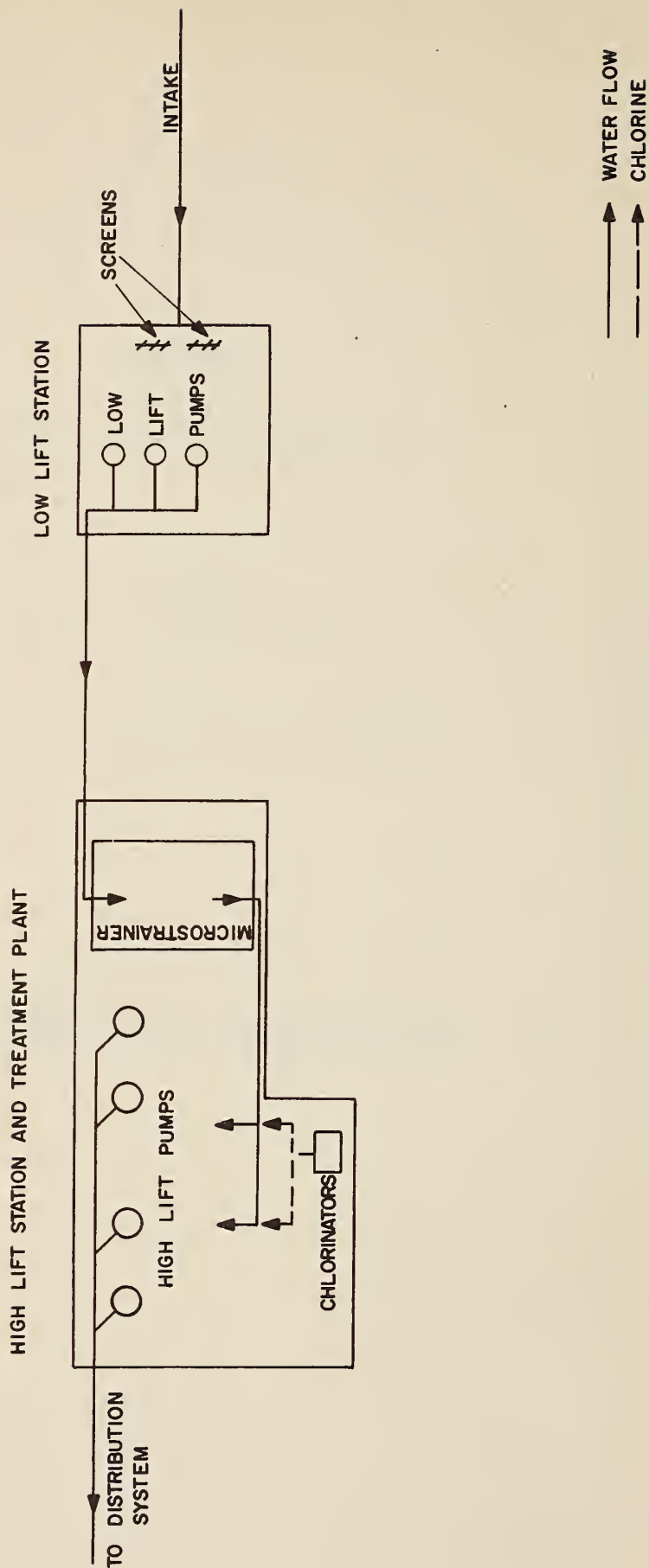
operated for

THE TOWNSHIP OF BERTIE

by the

ONTARIO WATER RESOURCES COMMISSION

**1969 ANNUAL OPERATING SUMMARY**



FLOW DIAGRAM  
BERTIE TOWNSHIP WATER TREATMENT PLANT



## DESIGN DATA

PROJECT NO. 6-0047-59

NOMINAL CAPACITY	4.5 mgd	RAW WATER SOURCE	Lake Erie
------------------	---------	------------------	-----------

### INTAKE

7 ft dia corrugated metal bellmouth  
intake in 15' sq timber crib

#### Depth

17 ft

#### Intake Pipe

Size: 1800 ft of 42" dia corrugated  
metal pipe  
Velocity: 0-87 ft/sec @ 4.5 mgd

### LOW LIFT PUMPING STATION

#### Pump Wells

Size: Two 13' x 10' x 24' swd  
(0.39 mil gal)

#### Screens

Coarse screens, 5' x 5' with 0.1"  
dia wire mesh at 3/8" centres (two  
per well)

#### Low Lift Pumps

Type: Worthington vertical turbine  
Size: Three 2100 gpm @ 25' tdh  
( @ 3 mgd each)

#### Microstrainer

Type: Glenfield & Kennedy with Mark  
O fabric (165,000 openings per  
52 inch)  
Size: One 10' dia x 10' long  
Capacity: 4.5 mgd

#### Clearwell

Size: 0.125 mil gal

#### High Lift Pumps

Type: Worthington centrifugal, single  
stage  
Size: Two 2100 gpm @ 254' tdh  
One 1300 gpm @ 254' tdh  
One 500 gpm @ 254' tdh

### CHLORINATION

Pre & Post chlorination  
Two W & T v-notch chlorinators  
Type: A-731

### STORAGE

Elevated tank (Crescent Park) 0.21 mil gal  
Standpipe (Ridgeway) 0.17 mil gal  
Standpipe (Stevensville) 0.17 mil gal  
Elevated Tank (Jockey Club-Private)  
0.21 mil gal

# '69 REVIEW

## GENERAL

The total system operating cost of \$55,221.91 was approximately eight percent higher than in 1968. The water production cost, which had shown a five-year low of nine cents per thousand gallons in 1967, peaked at 12 cents in 1969 because of increased operating costs and lower flows.

Total output decreased by nine percent from the 1968 water production. Maximum demands on the plant occurred during August; at the time of maximum daily flow, recorded the same month, only 70% of the plant's output capacity was reached.

The quality of the raw water remained relatively unchanged during 1969. The treated water has yet to achieve the OWRC standard for turbidity, although its bacteriological quality was satisfactory.

The plant is staffed by five full-time men and one part-time man. Coverage is given 24 hours a day, seven days a week.

## PHYSICAL EVALUATION

No major mechanical or treatment difficulties were experienced during the year. Repairs were carried out on the low voltage feeder cables supplying the project, but although these were temporarily effective, it became apparent in late 1969 that additional repairs would be required. Arrangements were made for the work to be carried out early in 1970.

An inspection of the intake pipe and crib structure indicated the general condition of the pipe, pipe joints and intake structure to be satisfactory. However, a large deposit of hard, sandlike material was found partially blocking the intake pipe at its mid-point. Although this blockage caused no operational problems, methods for its ultimate removal were under consideration. At the end of 1969, the general mechanical and physical condition of the project was excellent.

A report prepared by the Commission's Division of Sanitary Engineering recommended complete treatment be provided because of "the objectionable aspects of the quality of water obtained" at the plant.

## PLANT FLOWS

During 1969, 469.32 million gallons of water were supplied to industries and residents in the municipality. This represents a decrease of approximately nine percent from 1968. The average daily flow was 1.29 million gallons. The maximum daily flow of 3.13 million gallons occurred in August and the minimum, 0.75 million gallons, in both November and December.

## TURBIDITY

The turbidity of water is a measure of the interference presented by suspended matter such as clay, silt, finely divided organic matter and microscopic organisms present in the water. The OWRC standard for turbidity in treated water is one Jackson turbidity unit.

The Bertie Township plant did not meet this standard during 1969. Treatment provided at the plant is designed principally to remove algae and other gross solids from Lake Erie water by microstraining. The average treated water turbidity was 3 JTU.

## CHLORINATION and DISINFECTION

Analysis of 34 raw water samples showed total coliform counts with an average density of less than 32 coliforms per 100 ml sample. A total of 127 samples of treated water were taken, and analyses indicated that the water was bacteriologically safe for human consumption.

More than 6000 lbs. of chlorine were required for disinfection. This represents a slight increase over 1968 in the amount of chlorine required to maintain a residual of 0.5 milligrams per litre after 15 minutes' retention.

## WATER QUALITY

The treatment provided at this project is designed principally to remove algae and other gross solids from the Lake Erie water by microstraining. As a result, the chemical properties of the treated water are almost identical to those of the raw water.

In general, the treated water is moderately hard, and periodically contains iron and colour in excess of the recommended limits (0.3 mg/l and 5 units respectively). Although the high levels of iron, colour and turbidity impair the aesthetic quality of the water, they do not affect its fitness for human consumption.

## CONCLUSIONS

During 1969, the maximum daily flow imposed a 70% demand on microstrainer capacity (4.5 mgd) and 35% on high lift capacity (9.0 mgd). Total output decreased by nine percent, while the cost per 1,000 gallons rose to 12 cents from 10 cents in 1968.

Although the low voltage feeder cables and the intake blockage need correction, the general mechanical condition of the plant was very good during 1969.

The quality of the raw and treated water remained relatively unchanged from the previous year, and the plant failed to achieve the standard turbidity level in 1969.

## PROJECT COSTS

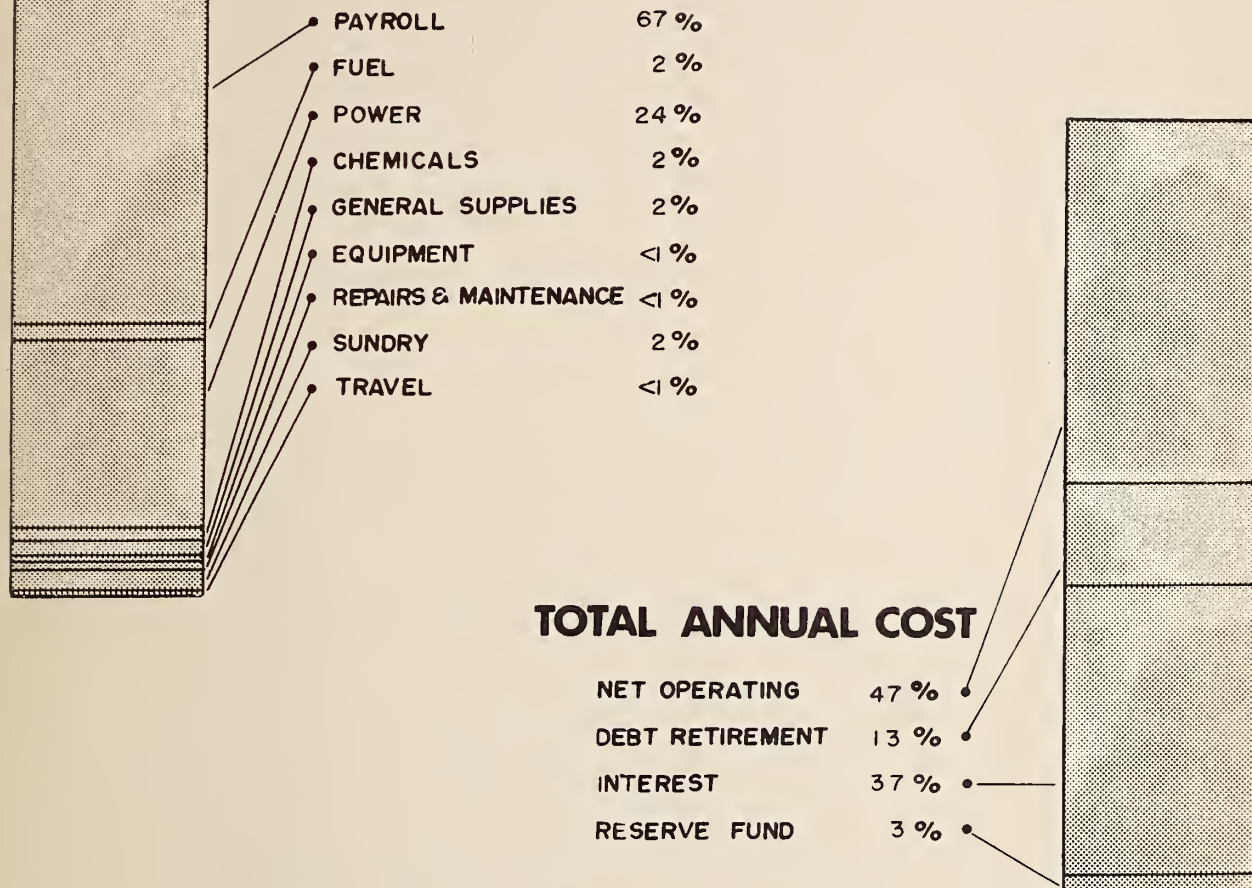
NET CAPITAL COST (Final)	
Long Term Debt to OWRC	<u>\$763,859.80</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	<u>\$164,433.53</u>
Net Operating	\$ 55,221.91
Debt Retirement	15,415.00
Reserve	3,280.32
Interest Charged	<u>42,764.58</u>
TOTAL	<u>\$116,681.81</u>

## RESERVE ACCOUNT

Balance @ January 1, 1969	\$ 42,463.66
Deposited by Municipality	3,280.32
Interest Earned	<u>2,485.96</u>
	\$ 48,229.94
Less Expenditures	<u>-</u>
Balance @ December 31, 1969	<u>\$ 48,229.94</u>



## 1969 OPERATING COSTS



## Yearly Operating Costs

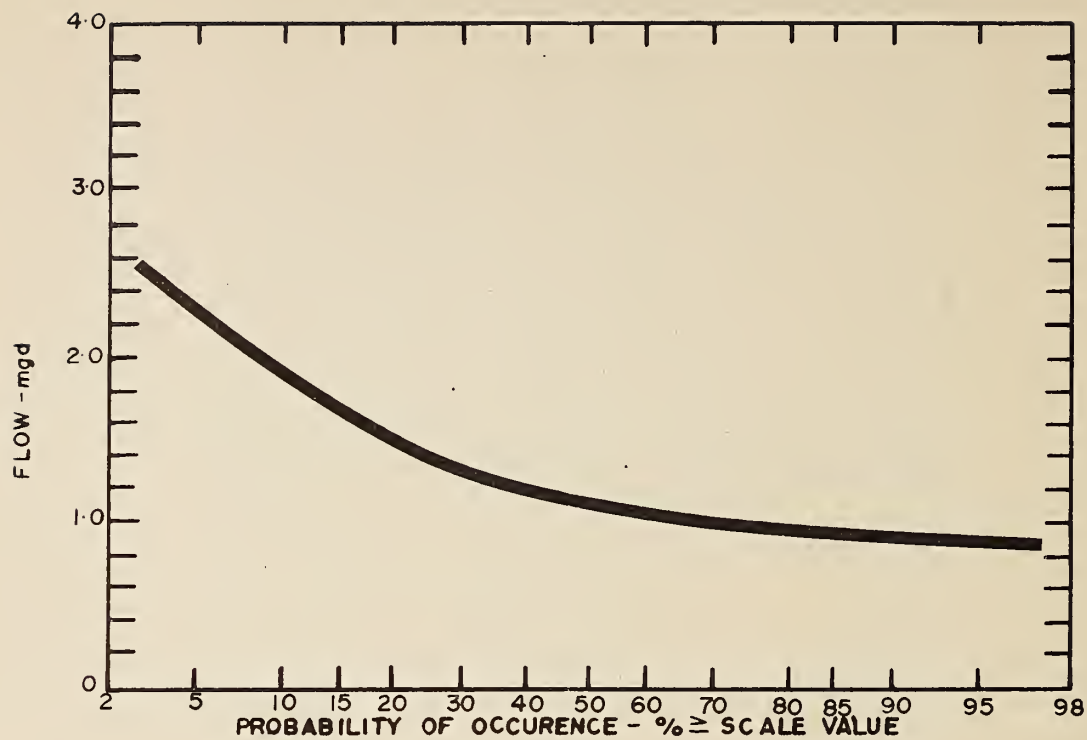
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER THOUSAND GALLONS
1965	370.56	\$42,165.16	\$ 0.11
1966	469.93	45,349.85	0.10
1967	506.22	46,873.97	0.09
1968	512.31	50,998.06	0.10
1969	469.32	55,221.91	0.12

## Monthly Operating Costs

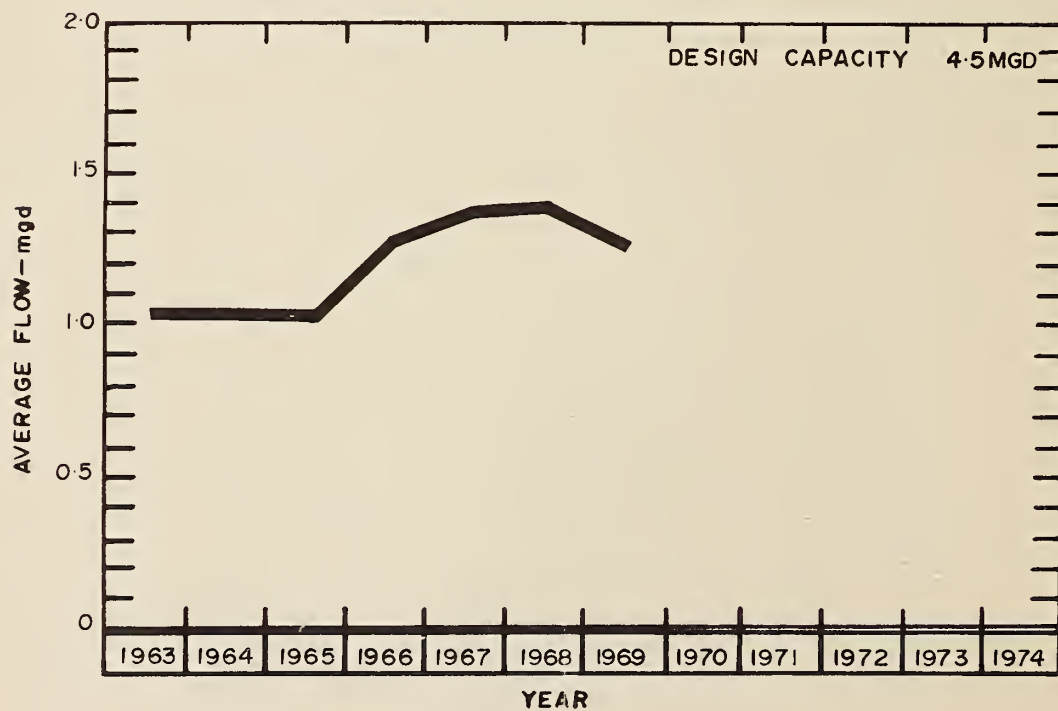
MONTH	TOTAL	PAYROLL	CASUAL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY	TRAVEL
JAN	5032.31	3667.28	189.33	-	1133.76	-	4.91	-	14.00	23.03	-
FEB	3968.39	2491.47	62.70	197.95	988.66	-	102.77	-	80.44	17.90	28.50
MAR	4072.51	2491.47	62.70	156.45	1085.45	-	46.77	-	-	202.07	27.60
APRIL	4167.52	2643.41	237.38	146.55	956.44	22.50	100.36	-	-	24.73	36.15
MAY	4463.04	2844.74	173.86	134.68	1031.87	-	-	-	160.00	87.19	30.70
JUNE	4725.61	3234.06	189.74	80.58	999.99	-	99.70	66.27	-	23.47	31.80
JULY	4151.85	2630.63	295.18	39.76	1029.16	-	117.90	-	13.07	3.50	22.65
AUG	5587.97	3909.82	427.53	10.12	1072.61	-	51.04	40.06	-	43.94	32.85
SEPT	4497.92	2624.45	110.34	4.95	1304.46	245.70	72.94	47.81	-	53.22	34.05
OCT	4208.38	2648.09	221.50	5.36	1156.24	104.00	46.25	-	23.44	3.50	-
NOV	4630.85	2618.02	285.02	20.18	932.34	491.40	-	-	112.89	35.45	135.55
DEC	5715.56	2623.94	205.62	221.34	1761.94	-	234.74	-	15.00	526.62	126.36
TOTAL	55221.91	34427.38	2460.90	1017.92	13452.92	863.60	875.58	154.14	418.84	1044.62	506.21



**PROCESS DATA**



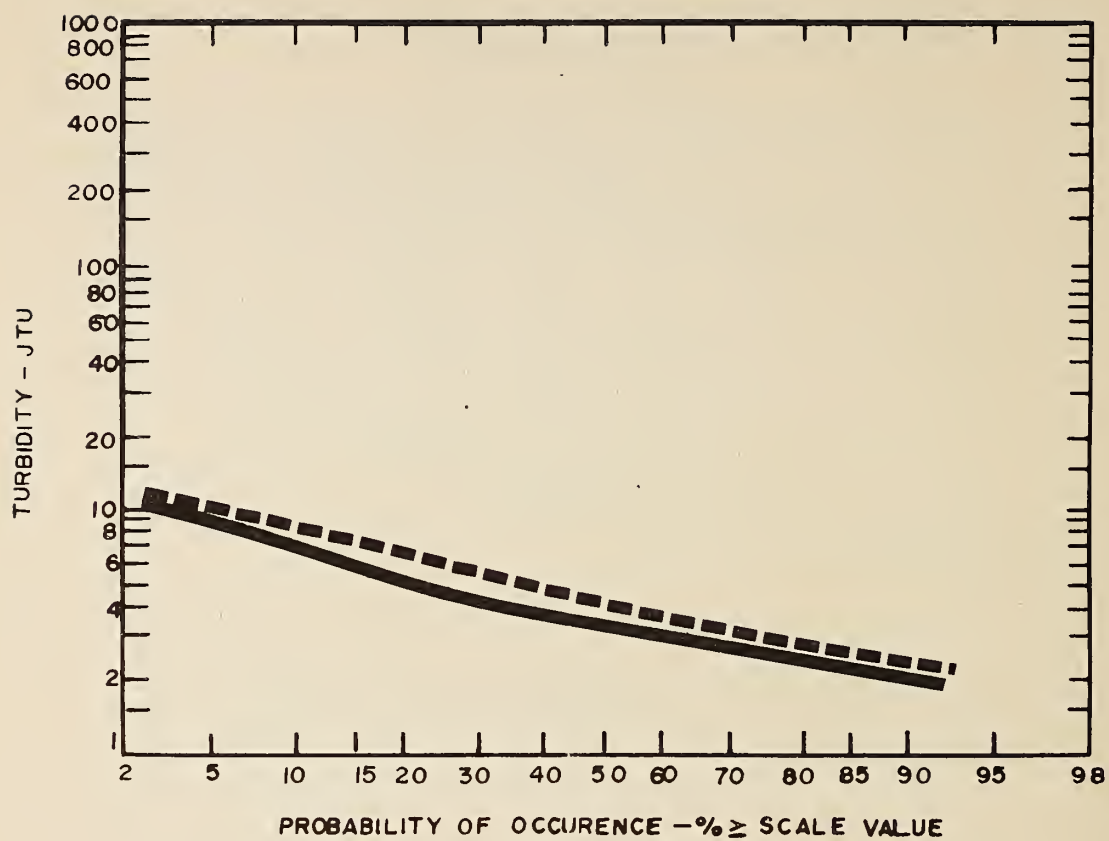
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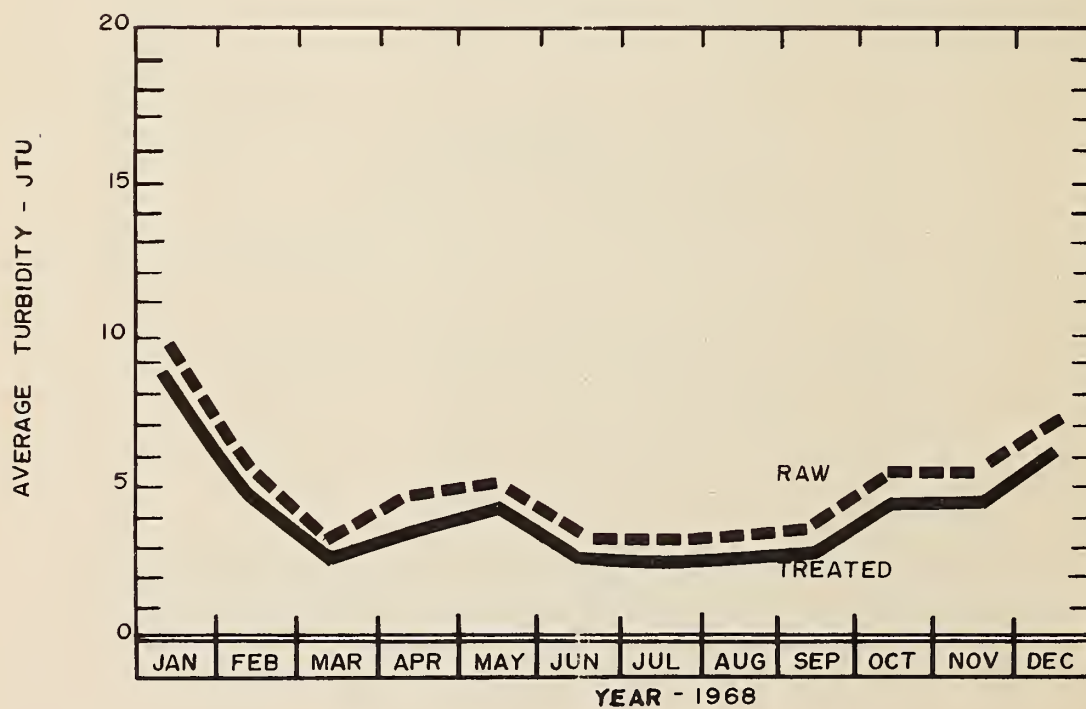


## PLANT FLOWS

MONTH	TOTAL FLOW		AVERAGE DAILY FLOW		MAXIMUM DAILY FLOW		MINIMUM DAILY FLOW	
	mil	gal	mil	gal	mil	gal	mil	gal
JAN	33.72		1.09		1.23		1.01	
FEB	29.27		1.05		1.14		0.95	
MAR	30.01		0.97		1.03		0.89	
APR	32.11		1.07		1.26		0.90	
MAY	38.20		1.23		1.52		1.02	
JUNE	41.97		1.40		1.86		1.18	
JULY	58.20		1.88		2.91		1.37	
AUG	68.88		2.22		3.13		1.54	
SEPT	45.47		1.52		2.62		1.13	
OCT	35.12		1.13		1.31		1.02	
NOV	29.03		0.97		0.95		0.75	
DEC	27.34		0.88		0.95		0.75	
TOTAL	469.32		-		-		-	
AVERAGE	-		1.29		-		-	



## TURBIDITY



## WATER QUALITY

PROPERTY	RAW WATER				TREATED WATER				DESIRABLE STANDARDS
	NUMBER OF SAMPLES	AVG	MAX	MIN	NUMBER OF SAMPLES	AVG	MAX	MIN	
HARDNESS mg/l $\text{CaCO}_3$	12	139	156	124	12	139	158	126	80 – 100
ALKALINITY mg/l $\text{CaCO}_3$	12	102	114	94	12	101	118	91	30 – 100
IRON mg/l Fe	12	.38	.80	.10	12	.26	.70	.10	< 0.3
COLOUR apparent colour units	12	< 10	30	< 5	12	< 9	30	< 5	< 5
CHLORIDE mg/l $\text{Cl}^-$	12	26	30	22	12	27	30	23	< 250

## CHLORINATION and DISINFECTION

MONTH	COLIFORM				CHLORINATION	
	RAW WATER		TREATED WATER		CHLORINE USED pounds	CHLORINE DOSAGE mg/ l
	NUMBER OF SAMPLES TAKEN	AVERAGE DENSITY No./100 ml	NUMBER OF SAMPLES TAKEN	NUMBER WITH COLIFORMS > 0/100 ml		
JAN	2	8	8	0	308	0.9
FEB	2	> 83	8	0	301	1.0
MAR	3	1	9	0	299	1.0
APR	2	0	8	0	314	1.0
MAY	2	> 12	8	0	397	1.0
JUNE	1	0	4	0	597	1.4
JULY	3	51	9	0	887	1.5
AUG	3	14	9	0	1016	1.5
SEPT	4	168	16	0	672	1.5
OCT	5	27	20	0	526	1.5
NOV	3	16	12	0	368	1.3
DEC	4	9	16	0	335	1.2
TOTAL	34	-	127	0	6020	-
AVERAGE	-	> 32	-	0	502	1.2

Date Due

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BERTIE  
OPERATING SUMMARY 1969.

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